

## 50 CFR Part 17

**Endangered and Threatened Wildlife and Plants; Notice of Finding on Petition to List Barton Springs Salamander****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** 90-day petition finding.

**SUMMARY:** The Fish and Wildlife Service (Service) announces a 90-day finding for the petition to add the Barton Springs salamander (*Eurycea* sp.) to the List of Endangered and Threatened Wildlife and Plants. The petition has been found to present substantial information indicating that the requested action may be warranted. A status review is initiated.

**DATES:** The finding announced in this notice was made on November 25, 1992. To be incorporated into the 12-month finding, information should be submitted to the Service by January 11, 1993 (see **ADDRESSES** below). However, the Service will continue to accept information on the status of the Barton Springs salamander at any time.

**ADDRESSES:** Information, comments, or questions concerning this petition should be sent to the State Administrator, Ecological Services Field Office, U.S. Fish and Wildlife Service, 611 East 6th Street, room 407, Austin, Texas 78701. The petition, petition finding, and supporting data are available for public inspection by appointment, during normal business hours at the above address.

**FOR FURTHER INFORMATION CONTACT:** Patrick Connor, Fish and Wildlife Biologist, at the above address (Telephone 512/482-5436).

**SUPPLEMENTARY INFORMATION:****Background**

Section 4(b)(3)(A) of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*), requires that the Service make a finding as to whether a petition to list, delist, or reclassify a species presents substantial scientific or

commercial information indicating that the petitioned action may be warranted. To the maximum extent practicable, this finding is to be made within 90 days of receipt of the petition, and the finding is to be published promptly in the **Federal Register**. If the finding is positive, the Service is also required to promptly commence a status review of the species concerned.

On January 22, 1992, the Service received a petition from Dr. Mark Kirkpatrick and Ms. Barbara Mahler to list the Barton Springs salamander (*Eurycea* sp.) as an endangered species. The petition also requested critical habitat be designated. The Kirkpatrick and Mahler document, dated January 22, 1992, clearly identified itself as a petition and contained the names, signatures, affiliations, telephone numbers, and addresses of the petitioners.

This finding is based on various documents, including the petition and sources readily available to the Service. Listing will be evaluated in accordance with the Act's requirements. In accordance with the Administrative Procedure Act (5 U.S.C. 553), the Service will consider the request to designate critical habitat and will review the information provided and otherwise available in its deliberation.

The Barton Springs salamander has been considered a Category 2 candidate species since December 30, 1982, when it first appeared in the Animal Candidate Review for Listing as Endangered or Threatened Species (Animal Notice of Review). Category 2 taxa are considered by the Service as candidates for possible addition to the List of Endangered and Threatened Wildlife, but for which conclusive data on biological vulnerability and threats are not currently available to support proposed rules.

**Biological Information**

The Barton Springs salamander is a morphologically and genetically distinct, but currently unnamed, species in the genus *Eurycea*. Sweet (1978, 1984) found distinct morphological differences between the Barton Springs salamander and other Texas *Eurycea*, but did not formally describe the salamander as a new species. Recent taxonomic work at the University of Texas, based on morphological and genetic data, clearly separates the

Barton Springs salamander from other Texas *Eurycea* (Texas Parks and Wildlife Department (TPWD) 1992). Based on geographic isolation and morphological and genetic differences, the Barton Springs salamander warrants recognition as a species (TPWD 1989, 1990, 1992, Sweet 1978, 1984, Chippindale, pers. comm., 1992).

The Barton Springs salamander is completely aquatic. Adults average about 2.5 inches in length. The Barton Springs salamander is a neotenic (retains a larval form with external gills throughout its life) salamanders from the Edwards Plateau of Texas.

**Population Status**

There are inherent difficulties in estimating the population size and range of aquifer-dwelling species, such as the Barton Springs salamander. The subterranean conduits, caverns and cavities where the salamanders are found are inaccessible to humans. Consequently, the abundance of Barton Springs salamander is unknown. Researchers have to rely on observing individuals that reach the surface. During the past 4 years, Barton Springs salamander juveniles have been found at one of the openings of Barton Springs (Andrew Price, Texas Parks and Wildlife Department, pers. comm., 1992; Hillis and Chippindale 1992, providing evidence that the subterranean population is reproductively viable).

The known range of the Barton Springs salamander is the subterranean, water-filled conduits, caverns, and cavities in a segment of the Edwards Aquifer near the Barton Springs, in Zilker Park, Austin, Texas (Sweet 1978, 1984; TPWD 1990, 1992). Hereafter, this aquifer segment will be referred to as the Barton Springs segment. Some individuals reach the surface in springhead areas in Zilker Park. Charles Sexton (City of Austin, *in litt.*, 1992) has reported sightings of adult Barton Springs salamanders during the summers of 1989, 1990, and 1991 in the Barton Springs swimming area. Despite searches for Barton Springs salamander in other springs, including springs in the Barton Springs segment, and in caves reaching the water table, the salamander has not been found outside of its currently recognized ranged (TPWD 1990).

Until the nearly 1970's, the Barton Springs salamander was commonly observed in aquatic vegetation in the Barton Springs headwaters (Hillis and Chippindale 1992). The abundance of salamanders in this area declined over the next 15 years. The decline can be attributed to maintenance of a vegetation-free area which has: (1) Reduced or eliminated areas where Barton Springs salamander can hide from predators; and (2) adversely affected the Barton Springs salamander's prey, particularly amphipods.

Within the Barton Springs segment, the distribution of Barton Springs salamander is limited by physical, chemical, and biological factors. Physical factors that define the distribution include the water level in the Barton Springs segment and size and pattern of water filled openings or pores in the limestone skeleton of the aquifer. Pertinent chemical factors range from the nutrient content necessary to sustain the aquifer community to factors that may adversely affect the community, such as high levels of total dissolved solids or contaminants in toxic amounts. One of the important biological factors is the distribution and availability of prey items (Samuel Sweet, University of California at Santa Barbara, pers. comm., 1992).

Attempts to propagate captive Barton Springs salamander have not succeeded (Andrew Price, pers. comm., 1992). Similarly, attempts to achieve laboratory reproduction in the San Marcos salamander (*Eurycea nana*) have been unsuccessful (Janet Nelson, Southwest Texas State University, pers. comm., 1992).

#### Threats to Barton Springs Salamander

Barton Springs salamander faces two principal threats: a deterioration of water quality and a decline in aquifer level in the Barton Springs segment. The restricted range of the Barton Springs salamander increases the immediacy of these threats because a single incident (e.g., a pollution event) could impact the entire known population.

#### Water Quality Threats

The Edwards Aquifer along the Balcones Fault Zone in the Austin Region has been identified as having the highest pollution potential among all the major aquifers in Texas (Texas Water Commission 1989). This is based on a combination of geologic, hydrologic, geomorphologic, and meteorologic factors (Texas Water Commission 1989). Austin, and the surrounding area, is rapidly developing (City of Austin 1988, U.S. Geological

Survey 1990). The watershed of the Barton Springs segment is a mosaic of urban, suburban, and rural land uses. Further development in the recharge area and watershed of the Barton Springs segment is likely to increase the levels of pollutants reaching Barton Creek, other creeks serving as recharge paths, and Barton Springs.

Urbanization has already affected surface water quality (USGS 1990). Analyses of surface water has found increased levels of suspended solids, biochemical oxygen demand, total organic carbon, total nitrogen, total phosphorus, and fecal-group bacteria. Fecal-group bacteria contamination at Barton Springs has occurred (USGS 1986). The conveyance and treatment of sewage in the watershed, particularly in the recharge zone, may result in an impaired local water quality. However, other than fecal-group bacteria, the water quality in the Barton Springs segment has been good (USGS 1986).

Potential contaminants of surface water and groundwater are: nutrients (nitrogen and phosphorous compounds), man-made organic contaminants including petroleum-related hydrocarbons, halogenated hydrocarbons, insecticides (organochlorine, organophosphate, carbamates, and pyrethroids), herbicides, and inorganics (such as cadmium, copper, lead, mercury, and zinc). These contaminants are of concern because: (1) They are stored, present, transported, or used in the watershed; (2) they affect aquatic life typically at trace levels; and (3) some contaminants may be present in pulses that are missed by periodic or regular contaminant sampling.

Barton Springs salamanders feed on amphipods and other similarly sized invertebrates inhabiting the Barton Springs segment of the Edwards Aquifer (Hillis and Chippindale 1992). Crustaceans, particularly amphipods, are sensitive to several organic chemicals (Fish and Wildlife Service 1986).

The Environmental Protection Agency has developed acute and chronic toxicity criteria for freshwater aquatic life for a number of contaminants (U.S. Environmental Protection Agency 1986). Data published by the U.S. Geological Services (USGS) (1986, 1990) indicate that some samples of water from streams in the Austin area, and groundwater in the Barton Springs segment, approach or exceed acute and/or chronic criteria for freshwater aquatic life. These contaminants include dissolved cadmium, copper, lead, mercury, and zinc.

Although the percentage of water samples that exceed these criteria for any particular contaminant has been small, contaminants may be present at values and durations capable of impacting Barton Springs salamander and/or its prey base. The availability/toxicity of these metals is decreased in water with high values of hardness and Barton Springs water is considered to be very hard, with a hardness greater than 180 mg/l as CaCO<sub>3</sub>. However, these metals may be more toxic when they occur in mixtures and with certain organics, such as ammonia. Additionally, the levels of detection used by USGS (1990) appear to be higher than the chronic lead and mercury toxicity criteria for freshwater aquatic life.

#### Threat From Decline in Aquifer Level

Reduced water levels in the Barton Springs segment would adversely impact the Barton Springs salamander by causing direct loss of habitat. Ground water pumping in the area is expected to increase due to further urbanization of the outlying areas of Austin. Currently, the amount of water discharged from the Barton Springs segment (both through pumping and springflow) is roughly equal to recharge (BS/EACD 1990). Aquifer water levels rise and decline in relation to rainfall. Artificial recharge enhancement in Onion Creek is being studied (BS/EACD 1990). Since aquifer water levels respond rapidly to differences between recharge and discharge, a combination of intense pumping and drought would result in reduced flows from Barton Springs. Barton Springs has always been recorded as flowing and one of the Barton Springs/Edwards Aquifer Conservation District's (BS/EACD) goals is to assure Barton Springs springflow "does not fall appreciably below historic low levels" (BS/EACD 1990). For this purpose, BS/EACD has developed a drought contingency plan.

Additional ground water pumping may exceed the resources of the Barton Springs segment and result in a change from the "existing dynamic equilibrium" to declining ground water levels and a decrease in (or cessation of) discharge at Barton Springs (USGS 1986). Barton Springs' long-term mean discharge is about 50 cubic feet per second (cfs), with a recorded minimum discharge of 10 cfs (USGS 1986). In 1982, estimated pumping from the Barton Springs segment was about 5 cfs (USGS 1986). Water well production in the higher elevations of the Barton Springs segment has been limited during periods of lower aquifer levels in recent years (Bill Couch, Barton

Springs/Edwards Aquifer Conservation District, pers. comm., 1992).

When aquifer levels are low, the potential exists for the movement of water with high levels of total dissolved solids from a "bad-water" zone to the freshwater zone of the Barton Springs segment, including Barton Springs (USGS 1986). The "bad-water" zone is an area of groundwater with total dissolved solids greater than 1000 mg/l. The "bad-water" zone occurs along the eastern boundary of the Barton Springs segment. The higher concentration of dissolved solids that would result from an encroachment of "bad-water" would likely adversely affect wildlife found in the aquifer supplying Barton Springs. The potential for "bad-water" encroachment is increased with pumping of the aquifer and extended low recharge or low flow conditions (USGS 1986). Under low flow conditions, Barton Springs, and a well near the "bad-water" line (YD-58-50-216), show increased dissolved solid concentrations, particularly sodium and chloride, indicating encroachment from the "bad-water" zone (USGS 1986).

After a review of the petition, the references cited, and information otherwise available to the Service, the Service found that the petition presented substantial information indicating that listing the Barton Springs salamander (*Eurycea* sp.) may be warranted. The Service will consider the request for designation of critical habitat. If the Service determines designation of critical habitat is prudent and determinable, it will be included if a proposed rule is published.

This finding initiates a status review for the Barton Springs salamander as required under section (4)(b)(3)(A) of the Act. The Service would appreciate any additional data, information, or comments from the public, government agencies, the scientific community, industry, or any other interested party concerning the status of the Barton Springs salamander.

#### References Cited

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#### Author

This notice was prepared by Patrick Connor, See ADDRESSES above, (512/482-5436).

#### Authority

The authority for this action is the Endangered Species Act (16 U.S.C. 1531-1544).

#### List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Dated: November 25, 1992

Richard N. Smith,

Acting Director, Fish and Wildlife Service  
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